IAC Mission Success Stories

WSTIAC — Weapon System Technology Analysis Center

WSTIAC   **Story 1**

IBARR System Intelligent Bridge Assessment, Repair, and Retrofit

Just ask any military Engineer to list his/her biggest headaches when moving into a new Area of Operation and they'll always list bridge assessment near the top. The current tool for this purpose is a military field manual that is difficult to use and often results in incorrect answers in the hands of anyone who is less than an expert. The U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, MS, recognized this problem and with the assistance of WSTIAC is producing a prototype bridge assessment code called Intelligent Bridge Assessment, Repair, and Retrofit (IBARR).

Continued on Story 1

Please visit our Web site at http://wstiac.iitri.org or send us an E-mail at rhayes@iitri.org

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IBARR System: Intelligent Bridge Assessment, Repair, and Retrofit (continued)

The PC-based IBARR code is designed with the soldier in mind. It features a user-friendly graphical interface for input of bridge parameters and provides rapid expert assistance in calculating bridge load classifications. The user inputs the measure values to define the bridge and IBARR draws the user-defined bridge onscreen as the inputs are entered. This allows the user to visually compare the defined bridge with the actual bridge, making any large-scale errors apparent. The bridge can then be saved to the database and edited at a later date.

One of the most critical aspects of bridge assessment is proper identification of the bridge type. There are numerous types of bridges and inexperienced analysts can often be misled in making this crucial decision. If this is incorrect, the final answer will undoubtedly be incorrect, possibly by an order of magnitude. To prevent this potential problem, an expert-system tool called the "Bridge Wizard" (BWIZ) is launched from within the IBARR code whenever help of this nature is desired. The BWIZ is an expert system in that takes the user through a set of queries similar to that which would be expected from a bridge expert when faced with the same decisions. The BWIZ provides slider bars that allow the user to answer each of the queries with varying degrees of confidence. This is important for this problem since the user will rarely know each of the answers with full confidence and the final answer should reflect the confidence to which each question is answered. A Bayesian logic Artificial Intelligence approach has been used to propagate the knowledge and its corresponding confidences through the network and provide the final answer with an associated confidence. BWIZ is also available as a standalone exe or as a DLL that can be incorporated into other projects.

For either product, for user questions/help, contact Travis Harrell at (601) 634-2360, for distribution/calculation questions, contact James Ray at (601) 634-2360.

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